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UNITED STATES NAVY

MEDICAL NEWS LETTER

Vol. 39 Friday, 1 June 1962 No. 11

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Vol. 39 Friday, 1 June 1962 No. 11

Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

PREVENTIVE MEDICINE IN MASS CASUALTY SITUATIONS

From The 1960 Staff Lecture Series, USNH San Diego, Calif. Reported by RADM A. S. Chrisman MC USN, Deputy Surgeon General of the U. S. Navy, and formerly CO, USNH San Diego, and CAPT V. C. Stratton MC USN (Ret), formerly Chief, Surgical Service, USNH San Diego.

The use of mass destructive weapons brings medical and preventive medicine groups face to face with new problems and intensifies old well-known ones. The prevention of injury and disease in nuclear warfare is a new and essential element of our plans for defense. Much of the material in usual teaching is directed toward surgical and medical management of mass casualties. There is much that can be done to prevent and reduce the number of traumatic casualties which should be an important part of planning for disaster. Armed Forces as well as civilians should be educated as to means of protection. If we operate our field forces as we should, there should be no great problems in preventive medicine except prevention of traumatic casualties. A combat unit normally operates in a semi-disaster condition. However, if we are to prevent disease and injury troops must be indoctrinated prior to disaster. This would require a continuing type of troop education in field hygiene and sanitation as well as self-help and emergency medical care. Regardless of where disaster and preventive medicine problems exist, whether in the United States or overseas, there will be many civilian casualties. Therefore, in discussion and thinking we must include cities and facilities for their people.

One of the things that caused the French much trouble early in World War II was that they failed to plan for evacuation of civilians when they were trying to move their armies. The French authorities recommended that civilians vacate certain large areas and suddenly it was found that these people were clogging all roads and were living off the country. This can happen to us in almost any theatre. It happened in Korea. In spite of combat lines, there was a constant stream of civilians walking from one part of Korea to another. Civilian people in our combat areas participated in mass movement. They put what they owned on their backs and started somewhere. They did not know where they were going or what they would do when they arrived at the end of their journey.

Health services must also be fully coordinated with other services in a disaster area in order to be effective. Preventive medicine services, as well as Medical, Ob-Gyn, Pediatric, Surgical and Surgical Sub-Specialty services, fire fighting, transportation, police, and rescue activities, must be coordinated or further confusion will be created and much effort lost.

Preventive medicine, as well as other services, can be divided into at least two phases after a disaster. These may be designated as a survival phase and a recovery phase. During the first few hours, saving life and prevention of

after effects are the all important health services. Medical service efforts must be united in order to provide the maximum result for the largest number of people. For the purpose of this presentation, preventive medicine is divided into a survival stage and a recovery stage; however, each item will be treated as a complete thought. Many of these functions overlap from one stage to another and, in different situations, may be moved from the recovery stage to the survival stage. Problems in preventive medicine can be reduced in general terms to these major items:

Thirst: water
Hunger: food
Exposure: shelter
Waste disposal
Insect and rodent control
Disposal of dead human beings and animals
Communicable disease control
Mental hygiene
Special health services

These items are listed "somewhat" in order of their need. However, all are of the utmost importance. Water would be the first essential survival item, closely followed by food and shelter. Later, such problems as waste disposal, disease control, insect and rodent control, mental hygiene, and other special services would gradually assume increasing importance. It is imperative that as early as possible after disaster strikes, clear authoritative information about water, food, waste disposal and—in inclement weather—shelter be given to survivors. This can best be accomplished by means of broadcasting information from helicopters or trucks. As soon as possible, teams should be placed in charge of small areas to educate people and enforce sound hygiene and sanitation practices.

Water. Following a disaster, people are soon going to drink some type of fluid. The fact that it might still flow from a spigot even makes it more serious because a false sense of security makes people oblivious to the possibility of contamination of the water supply. It is, therefore, very important that people be instructed early where to get drinking water and how to conserve the water available. Adequate emergency water supplies can be provided from the following sources; however, early self and group disciplines are necessary to conserve the precious liquid by rationing to meet the minimal basic survival needs.

Stored water
Bottled drinks
Fresh fruits
Water in hot water heaters and furnaces
Canned fruits and vegetables
Refrigerated milk in homes, dairies, and truck tanks
Fruit juices and ice
Distillation of nonpotable and/or sea water
Water points established in destroyed or damaged areas by use of mobile water tanks, etc.
Canned water and many varieties of canned fruit juices

Municipal or local water supplies will probably become inoperable as a result of bombing. If operable, water in the early stage is desperately needed for fire fighting. Likewise, water coming from a spigot will probably be contaminated because of:

Breaks in water and sewer lines in the same crater. If there be any water, the pressure will likely be low due to fire fighting demand.

Nonpotable water pumped into water mains for fire fighting.

Water secured from any source for emergency purposes should be boiled prior to use or made potable by the addition of chlorine or iodine tablets. In an emergency, a source of chlorine is available in certain household bleaching agents, such as Clorox or Purex. Many labels on these containers indicate how much of the material should be added to water in order to provide a safe fluid. As time, equipment, and personnel permit, water can be provided by emergency methods and later by restoration of the water distribution system. In special terrain and situations, wells may be dug or drilled. However, radiation monitoring should be used.

Food. Immediately following the problem of potable water will be the requirement for food. Emergency food supplies are available in canned and packaged food items. The increased use of dehydrated items, such as dried milk, has greatly enhanced the value of the pantry and grocery store as a source of emergency supply of foods. Much, if not all, canned and packaged food is safe for consumption following a nuclear explosion, or biologic or chemical warfare attack. Frequently, the outside can or container is contaminated and yet the food inside is perfectly safe to eat. One of the first major problems to arise is the provision of milk, especially for young infants. Adults and children a few months of age can survive for many days without any milk supply. Normal nutrition (and part of the water needed) can be maintained by the substitution of canned infant and baby foods. The present day prepared packaged and canned infant foods provide a suitable substitution for milk in emergencies. All milk should be boiled in the event pasteurization plants are missing and/or satisfactory transportation for distribution is not available. The production of questionable milk supplies should be closely watched. After the survival stage, foods can be brought in from other sources outside the disaster area.

Shelter. Most of the shelter in a disaster area would be removed by the "big breeze" and/or fire following a nuclear blast. The destruction of shelter substantially adds to the discomfort and desperation of survivors; therefore, a tremendous increase in the need for shelter occurs. This is especially true in the winter season and in rain or snow. The crowding of people into small places and mixing populations from one sector of an area into another increase the chance of everyone acquiring an upper respiratory infection, as well as intestinal infection. Shelter can and must be provided in the area by restoration and rehabilitation of certain buildings not required for emergency care of the sick and wounded. Decontamination of buildings would be a major problem mainly in mustard gas attacks.

Waste Disposal. Early attention to the problems of waste disposal is essential. Increased disease hazards develop at the time of a warning to vacate a city and increase following a disaster. Some readers know about the "proposed evacuation" of San Francisco in which all civilians would be told to leave at once for Salt Lake City, Utah. Seventy-two hours after the first automobile made its exit from San Francisco, the same car would be arriving in Salt Lake City and the last car would be leaving San Francisco. Along this route of travel there would be a problem of human waste disposal. In addition to a string of cars from San Francisco to Salt Lake City there would be a line of fecal, urinary, and other waste along the entire route. Such an emergency trip could generate a situation in which many people are likely to have diarrheal disorders. Waste disposal in a large congested area becomes quite a problem. Emergency methods of disposal of human waste might consist of: pit latrines, trench latrines; cat holes; manhole on sewer, bucket or pail; and designated areas.

In addition to human waste, there would be an accumulation of food waste and other dead or decaying material which should be burned or buried. From the earliest moment, meticulous care should be exercised to insure that all types of waste, especially human waste, are adequately covered and do not become a source of transmission of intestinal diseases to others, or serve as insect breeding sites. One leading problem in disaster areas would be bacillary dysentery. In surveys of healthy American people it has been found that one to ten percent have positive stools for Shigella organisms. If we pile human waste and people close together under difficult conditions we increase tremendously the problems of disease control. Sanitary teams should be organized early to supervise disposal of waste and educate people in safe practices.

One of the most urgent problems would be the immediate burying of dead human beings, animals, and birds because they would constitute a serious problem in spreading diseases and increasing insect life.

Numerous special teams would have to be organized early for burial of large numbers of dead within a short period of time. If transportation were lacking, burials would have to be performed locally in the best manner available. Mass graves have been used in past disasters and might be the best solution.

Insect and Rodent Control. During the survival stage one of the problems in insect control would be to assure that waste is properly disposed of, that debris is cleaned up as soon as possible, and mosquito-breeding areas are oiled or drained. Insecticides, if available, should be used in housing areas along with the fly swatter. Immediately after disaster, insects would provide no great hazard except in areas where yellow fever, typhus, malaria, dengue, scrub typhus, filariasis, and other insect-borne diseases already exist. Normally, insect and rodent killing programs can be delayed until after the survival stage. The insect and rodent problem is decreased if, during the survival stage, care is taken for effective waste disposal and other sanitary devices. One exception to delayed insect control is made in the event the disaster is followed by an attempt on the part of the enemy to disseminate biologic warfare

agents transmitted by insects and rodents, such as yellow fever and plague. This, however, will be difficult to recognize. Flea dusting—particularly of rodent habitats—should be followed by rodent control with rodenticides. In general, insect control can be provided by mist blowers and mounted or hand sprayers. Aerial spraying of effective insecticides may be advocated in areas which are difficult to reach by other means and will afford a satisfactory reduction in adult insects. Along with this program must be an intensified educational program. Every effort should be made to obtain the services of qualified Entomologists.

Communicable Disease Control. Health problems are accentuated during and following movement of troops, workers, and evacuees, with or without disruption of normal safeguards. Therefore, measures used in control of infectious diseases must be stressed and more attention paid to these measures than under normal circumstances. Also means of artificial transmission of diseases by biologic attack must be kept in mind. People must protect themselves by maintaining a high degree of personal hygiene and environmental sanitation. Immediately when we attempt communicable disease control we get into the problem of immunization. While immunizations against certain diseases give protection they must not interfere during the survival stage with the essential other elements of life-saving and protection. The military population should be pre-protected to such a degree that no additional immunizing agents would be required except in special situations involving cholera, yellow fever, epidemic smallpox, and possibly typhus and plague. However, in civilians it will be essential to give immunizations for typhoid - paratyphoid, smallpox, and certain other diseases. If adequate poliomyelitis vaccine is available, this might well be considered because of the lack of sanitation following a disaster. However, while inoculation is a dramatic procedure which gets much publicity, it can wait a few days with the possible exception of cholera in cholera-endemic areas. Antibiotics and chemoprophylactic agents are drugs which should not be used on masses of people in order to prevent the occurrence of communicable diseases except under unusual circumstances.

In malarial areas, consideration might be given to the suppressive treatment of all people with Chloroquine or other available suppressive drugs. The current malaria chemoprophylaxis schedule of the U. S. Navy: Chloroquine phosphate, 0. 5 Gm tablet by mouth once weekly for duration of exposure; when exposure is terminated, a single 1. 0 Gm dose of Chloroquine phosphate is taken followed by a course of Primaquine phosphate, 26.3 mgm tablet, daily for 14 days. If these drugs are not available, use Quinacrine (Atabrine), 0.1 Gm tablet orally, daily for 6 days each week during exposure to malaria.

Personal hygiene, adequate housing, safe food and water, along with insect and rodent control, are the important considerations for the prevention of communicable diseases. This, of course, must be supplemented with educational programs to encourage people to maintain essential personal hygiene and strict sanitary discipline.

Mental Hygiene. Following a disaster there might be some increase in the incidence of psychologic disturbances. Experience during World War II did

not show marked increase in the incidence of such mental disorders. Psychologic and emotional disturbances could occur and might be chiefly of the following types:

Severe apprehension, agitation, hysteria and hysterical conversion phenomena, tension states, panic and uncontrolled flight or frantic purposeless activity, stunned mute behavior, trembling tearful helplessness, apathetic depressed states, inappropriate activity, or preoccupation with somatic representations of increased emotional tensions. Typically, such disorders are temporary amorphous reactions which are self-limited, lasting for minutes, hours, or days—rarely for weeks. However, in some people, undue sensitivity to danger stimuli may be evident for many weeks. They may have a persistent increased state of apprehension with insomnia, heightened irritability, poor appetite, weight loss, and markedly diminished work efficiency.

This problem can be minimized at the time of a disaster by forceful leadership, provision of timely and authoritative information, and the organization and working of people in some useful service, regardless of their prior background. In the prevention of mental disturbances, people can well assist in the control of environmental hazards by helping in removal of waste accumulation which in turn prevents the multiplication of insects and rodents.

Special Health Services. Aside from surgical and other clinical specialty services in the management of mass casualties, many special health services must be provided and are considered of public health importance. They are:

Obstetrical services	Care of the aged, infirm, and disaster orphans
Pediatric services	Sanitary supplies
Dental services	Control of stray animals and prevention of rabies
Nursing services	Reports and records; and decedent affairs
Pharmaceutical services	
Laboratory services	

Obstetrical Services. The Hiroshima experience indicates that about 27% of surviving pregnant women near the explosion may abort or have premature deliveries during the time of disaster. The World War II German experience was that over 10% of pregnant women in the air raid area had abortions or premature deliveries. Emergency medical care, probably by other than trained physicians, must be provided for these people as well as for premature infants. Evacuation from the area is advisable; however, if impossible, provisions must be made for the delivery and care of these patients in the disaster area. People trained in antepartum and postpartum care should be found to care for them; this would include nurses and midwives. Premature infants would need facilities for resuscitation, aspiration of fluids, transfusions and intravenous solutions, shelter, clothing, warmth, nutrition, and oxygen on occasions. Morbidity and mortality rates would likely be excessive for newborns and mothers alike under extremely adverse circumstances.

Pediatric Services. Special pediatric emotional, feeding, and infectious problems should be cared for at the nearest setup arranged by Internists, Pediatricians, and Public Health personnel.

Dental Services. The need for oral surgeons in a disaster area increases and casualties with fractures of the mandible or maxilla require such treatment. While most dentists in the area should be caring for the sick and wounded, some must be reserved for emergency dental care. Many persons who are essential to the rescue operation would require special dental appliances to carry on for any great length of time.

Nursing Services. Special nursing services must be set up for obstetrical cases, pediatric cases, the aged and crippled, as well as the numerous traumatic casualties. Nurses are trained in special fields and an attempt should be made to use them to the best advantage. Nurses who are pregnant should be used on a part-time or limited basis. As many nurses as possible with Public Health experience should be assigned during and immediately after the disaster in order to reduce, if possible, the demands on trained medical personnel for treatment.

Pharmaceutical Services. People must be supplied with special drugs. Among them are insulin, cardiac drugs, certain biologicals, anti-hypertensive agents, tranquilizers, and/or sedatives for the extremely disturbed. Morphine syrettes should be available for victims with excruciating pain who have wounds in which opiates are not contraindicated. Selective use of tranquilizers and barbiturates may be of great assistance in certain types of mental and cardiac disturbances.

Care of the Aged, Infirm, and Disaster Orphans. Special medical and nursing care, as well as proper food and housing, must be provided for this group.

Laboratory Services. Essential laboratory services for the care of traumatic and medical emergencies must be maintained. Also, laboratory services must be established for the detection of communicable diseases and all possible help in finding information in regard to biologic warfare. Laboratory facilities might likewise be considered for the preparation of biologicals when they are not at hand and can be produced in quantities in a short time.

Sanitary Supplies. Immediately, plans must be made for procurement of supplies for purification of water, insect and rodent control, and in the later stages, to be sure that people have adequate personal sanitary supplies, such as soap, towel, and change of clothes.

Control of Stray Animals and Prevention of Rabies. The control of stray and hungry animals, especially dogs and cats, in a disaster area is essential to prevent rabies.

Reports and Records; and Decedent Affairs. Following the survival stage, plans should be made for tabulating and keeping simple but adequate records of disaster effects and for recovery and future planning purposes. All possible identifying data should be included on abortions, miscarriages, premature and mature births, deaths at all ages, malnutrition, communicable disease incidence and control measures, epidemics, and categorized casualty reporting. An example of the latter could be injury by thermal burn, crashing or flying objects from blast wave, or by ionizing radiation (direct or fallout) from a thermonuclear explosion. Wherever possible the burial sites for the dead

should bear identification markers, giving name, age, cause and date of death for each deceased. Any biologic or chemical warfare victims should likewise be tabulated, naming the agent if identified.

Close working liaison with town, city, county, state, and federal civil defense and medical agencies should be established and practiced as soon as the situation permits.

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Basic Criteria for Blood Transfusion*

Standards for a blood transfusion service, including those published by the Joint Blood Council and the American Association of Blood Banks, have been limited to proper methods of avoiding reactions and have not emphasized the indications for transfusion as well as choice and amount of material for various conditions.

The term "transfusion service" implies more than simply furnishing material for a transfusion. The practice of transfusion requires technical knowledge and experience. Physiopathologic states and the hydrodynamics of circulation must be evaluated when transfusions are considered. Because of its inherent danger, transfusion involves great responsibility on the part of all participants.

In case of unfavorable reaction following a transfusion, much of the responsibility rests with the physician who has ordered the procedure. Requests for transfusion of whole blood or blood derivatives should be made with notation of the indication for transfusion. This would allow the physician or physicians in charge of the transfusion service to advise concerning the speed and volume of transfusion as well as the type and quantity of material best suited to the patient's needs.

Requests for blood transfusions for elective operations should be made at a reasonable time before the operation with full consideration of the actual expected need.

Criteria for Choice of Transfusion Material

Whole Blood Versus Blood Components or Derivatives. For optimal therapeutic effect and for maximal utilization of blood resources, whole blood transfusion should be used only when whole blood is needed.

Whole Blood. Whole blood transfusions should be used primarily in the treatment of, or anticipation of, acute blood loss when it is necessary to restore or maintain the blood volume as well as the oxygen-carrying capacity. Plasma, albumin, or volume expanders may be used temporarily while whole blood is being made available. Blood of any acceptable period of storage may

* This report is an appendix to the Joint Blood Council Scientific Committee Report which was approved by the Joint Blood Council Board of Directors on 29 October 1961. Published in J. A. M. A. 180: 230-231, 21 April 1962.

be used for the relief of acute blood loss, except for the conditions noted below. A patient who has had a severe hemorrhage, but in whom bleeding has subsided, or a severely anemic patient in the course of an acute condition may receive blood which has been stored up to its maximal dating period.

Fresh Whole Blood or Fresh Platelet-Rich Plasma. Use of fresh whole blood (less than 24 hours old) should be limited to patients suffering from acute hemorrhage due to thrombocytopenia, hemophilia, or other coagulation defects caused by deficiency of unstable factors.

Blood not over 5 days old should be used in patients with Factor V deficit (Ac-Globulin, proaccelerin, labile factor) and for exchange transfusion in erythroblastotic infants.

If bleeding occurs in the course of thrombocytopenia without significant associated anemia, platelet-rich plasma separated from citrated blood not over 24 hours after collection may be used.

In patients with active bleeding from hemophilia, but not significantly anemic, specially prepared plasma separated from fresh blood is the material of choice. This plasma must be used at once, or stored freeze-dried or frozen.

When an actively bleeding patient requires numerous transfusions in rapid succession, it is desirable to use some fresh blood containing the maximal amount of fresh platelets to avoid excessive exhaustion of platelets in circulation.

Packed Red Blood Cells. Packed red blood cells supply nearly all of the oxygen-carrying capacity of the blood with about one-half the volume of whole blood and with significant reduction of plasma constituents. They are adequate for transfusing anemic patients who are not hypoproteinemic and are particularly used in those with associated heart or kidney disease, especially if edema is present or impending.

The use of packed red blood cells (less than 5 days old) is recommended when the recipient must depend on repeated transfusions for survival in the course of severe anemia. Blood nearing its expiration date should not be used for such patients, as in so doing more transfusions will be required for the maintenance of an adequate level of hemoglobin, thus exposing the patient to the danger of iron overloading, hepatitis, and other transfusion hazards.

When making a decision regarding use of packed red blood cells or whole blood for the treatment of chronic anemia, the physician should consider cardiac reserve, blood volume, hemoglobin concentration, underlying disease, and symptoms resulting from the anemia. Packed red blood cells should be used especially for patients with a low cardiac reserve and a normal or increased blood volume.

Plasma, Plasma Fractions, Albumin. In the treatment of shock due to selective loss of plasma components rather than to blood loss, albumin or plasma is better for replacement than whole blood. Examples of this situation may be found in acute pancreatitis, acute mesenteric thrombosis, and extensive burns.

In the treatment of hypoproteinemia when there is edema with increased body sodium, human serum albumin is the preferred replacement therapy. In

hypoproteinemia unassociated with edema (as, for example, in chronic undernutrition), albumin, plasma, or stable plasma protein fraction are satisfactory.

Single Transfusion. A predominance of single transfusions (more than 50%) in any hospital implies a need for critical reassessment of blood usage in that hospital, with the recognition, however, that there are indications for the single transfusion.

Transfusing convalescent patients with moderate anemia is usually unnecessary.

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Typhoid Fever in Europe

H.G. Baity, "A Forward Look in World Sanitation." Royal Society of Health Journal, July - August 1958.

"It is surprising to find a continuing high incidence of the enteric diseases punctuated by recurring epidemics, in several of the most enlightened countries. The World Health Organization (WHO) statistics indicate that in Spain, between 1937 and 1950, the average annual number of deaths from typhoid was 3052. In the last 8 years of record, there have been 128,261 recorded typhoid cases in that country. In the Federal Republic of Germany from 1947 to 1954 there have been 59,540 cases of typhoid fever, and in recent years there have been some explosive epidemics.

In France—the home of Pasteur—it is paradoxical that there have been 73,299 cases of typhoid fever in the last 8 years for which records have been published, and that over the last 15-year period the deaths from this cause have averaged almost 800 annually. This compares unfavorably with the record across the Channel where in England and Wales, with a population slightly higher, the average annual number of deaths from typhoid fever was only 46. But even in England, there was a typhoid outbreak as late as 1937 caused by a temporary breakdown in water purification processes at Croydon.

In Italy is found perhaps the most surprising and consistent record of lingering intestinal disease. In the past 8 years, 203,686 cases of typhoid fever have been recorded, and in the last 17 years of record there has been an average of 3890 deaths annually from this cause."

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Nitrites in Bronchial Asthma

Irving Hirshleifer, Woodmere, N.Y., and Yogesh Arora, Brooklyn, N.Y. Dis Chest 39: 275-283, March 1961. Abstract: Ohio Med J 58: 315, March 1962.

Separate tests of sublingual nitroglycerine and sublingual erythrityl tetranitrate resulted in subjective improvement and increased one second timed vital capacity. Tests in two patients showed that 0.6 mg nitroglycerine is equally effective

whether administered orally or sublingually; the authors have found that both nitrites are as effective orally as sublingually in patients with cardiovascular disease.

Six patients were then tested with 15 mg erythrityl tetranitrate, 0.3 mg nitroglycerine, and 15 mg isoproterenol, all given by the sublingual route. They were evaluated by closed spirometry methods and one second timed vital capacities. The time of onset of action was usually within 10 minutes with all three drugs. The maximum effect averaged 20 minutes for nitroglycerine and for isoproterenol, and 45 minutes for erythrityl tetranitrate. The duration of action was one to three hours with erythrityl tetranitrate, 45 to 90 minutes with nitroglycerine, and 20 to 45 minutes with isoproterenol.

In none of these six patients was the peak effect of isoproterenol upon vital capacity greater than that of the nitrites; it was often lower.

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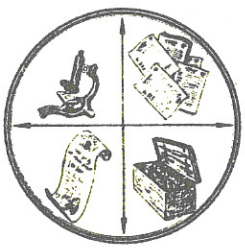

MISCELLANY

Anniversary Messages to U.S. Navy Nurse Corps

"On the occasion of the fifty-fourth anniversary of the U.S. Navy Nurse Corps, I wish to extend greetings and warm congratulations to the women of this very important member of the Navy Medical Department team. Although rapidly changing concepts of medical and nursing service have taken place during recent years, the Navy Nurse Corps has successfully met the challenge of supporting the needs of a nuclear-powered Navy and a technological age. May I wish each and every Navy nurse,

Happy Birthday"

s/ FRED KORTH
Secretary of the Navy

"On the 54th anniversary of the U.S. Navy Nurse Corps, I am sincerely proud to extend my congratulations and best wishes to all the women who comprise this outstanding member of the Navy's Medical Department. Your devotion to duty and your many contributions to the health of those

in the U. S. Navy and Marine Corps provide strong and invaluable support to all of us in the accomplishment of our mission. Happy Birthday."

s/ GEORGE W. ANDERSON
Chief of Naval Operations

"It is with great pleasure that I send my most sincere congratulations to all of you on the 54th anniversary of the establishment of the Navy Nurse Corps, May 13.

As very important members of the Medical Department team, your devotion to duty in providing nursing services in the United States, at sea, and overseas, lend strong support to the accomplishment of our mission.

With today's rapidly changing concepts of medical and nursing practice, present and future Navy Nurses will be privileged to add an interesting chapter to the history of devoted service and leadership of thousands of professional women who have served in the Nurse Corps during the past fifty-four years.

HAPPY BIRTHDAY"

s/ E. C. KENNEY
Rear Admiral MC USN
The Surgeon General

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Captain Erickson, Director of Navy Nurse Corps

Captain Ruth A. Erickson NC USN was administered the oath of office as the Director of the Navy Nurse Corps by Secretary of the Navy, Fred Korth, on Monday 30 April 1962. She relieved Captain Ruth A. Houghton NC USN who retired from active naval service on 1 May 1962 following four years as Director of the Navy Nurse Corps, and almost 27 years of naval service.

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Fire Department and Rescue Squad Training

A Rescue Squad Seminar was held at the National Naval Medical Center, Bethesda, Md., from 0800 to 1700 on Saturday, 19 May 1962. This training session, sponsored jointly by the Naval Medical Center and the Montgomery County Medical Society, was conducted in the Main Auditorium of the Center.

All members of Rescue Squads and Fire Departments in Montgomery and Prince George Counties, Md., were invited to attend. The program was specifically designed for Rescue and Fire Department personnel engaged in rendering first aid to the sick and injured. It is felt that the program was constructive and beneficial to each attendee, thus contributing to a continuation of the outstanding services now rendered by Rescue Squads and Fire Departments of the surrounding areas.

Hosts for the event were the Naval Medical Center Fire Department and the Bethesda-Chevy Chase Rescue Squad. Titles of presentations by Staff Medical Officers of the U. S. Naval Hospital, U. S. Naval Medical School, and U. S. N. Dental School, NNMC, were: Casualty Care Training, Respiratory Emergencies, Cardiac Arrest, Surgical Emergencies, Fractures, Burns, Heat Stroke and Heat Exhaustion, First Aid Handling and Transportation, Pediatric Emergencies, Chemical Warfare Defense, and Obstetrical Emergencies. Motion picture films and periods of questions and answers were freely employed throughout the meeting.

NOTE: This example of excellent and practical training liaison with local medical societies, rescue squads, and fire department personnel is highly commendable. It is based upon a sound concept of the need for such a relationship—if we are to face up to our responsibilities for joint action in meeting any possible conventional or ABC Warfare disaster. —Editor

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Nuclear Weapons Medical Symposium (NWMS) FY 1963

Class	Inclusive Dates	Deadline Date to Apply
NWMS - 13	15 - 19 October 1962	6 August 1962
NWMS - 14	22 - 26 April 1963	11 February 1963

The above scheduled Medical Symposiums will be conducted at the Field Command, Defense Atomic Support Agency, Sandia Base, Albuquerque, N. M.

TOP SECRET security clearance is required on all candidates approved for attendance. Also, Department of Defense participants must be certified to the Atomic Energy Commission for access to Restricted DATA by their respective organizations in accordance with appropriate Service regulations.

In view of the anticipated shortage of travel funds for fiscal year 1963, only a limited number of officers can be authorized to attend the symposiums on travel and per diem orders chargeable against Bureau of Medicine and Surgery funds.

Requests should be forwarded in accordance with BUMED INSTRUCTION 1520.8 and comply with the deadline dates as indicated above. All requests must indicate that a security clearance of TOP SECRET has been granted to the officer requesting attendance. (Training Branch, Professional Div., BuMed)

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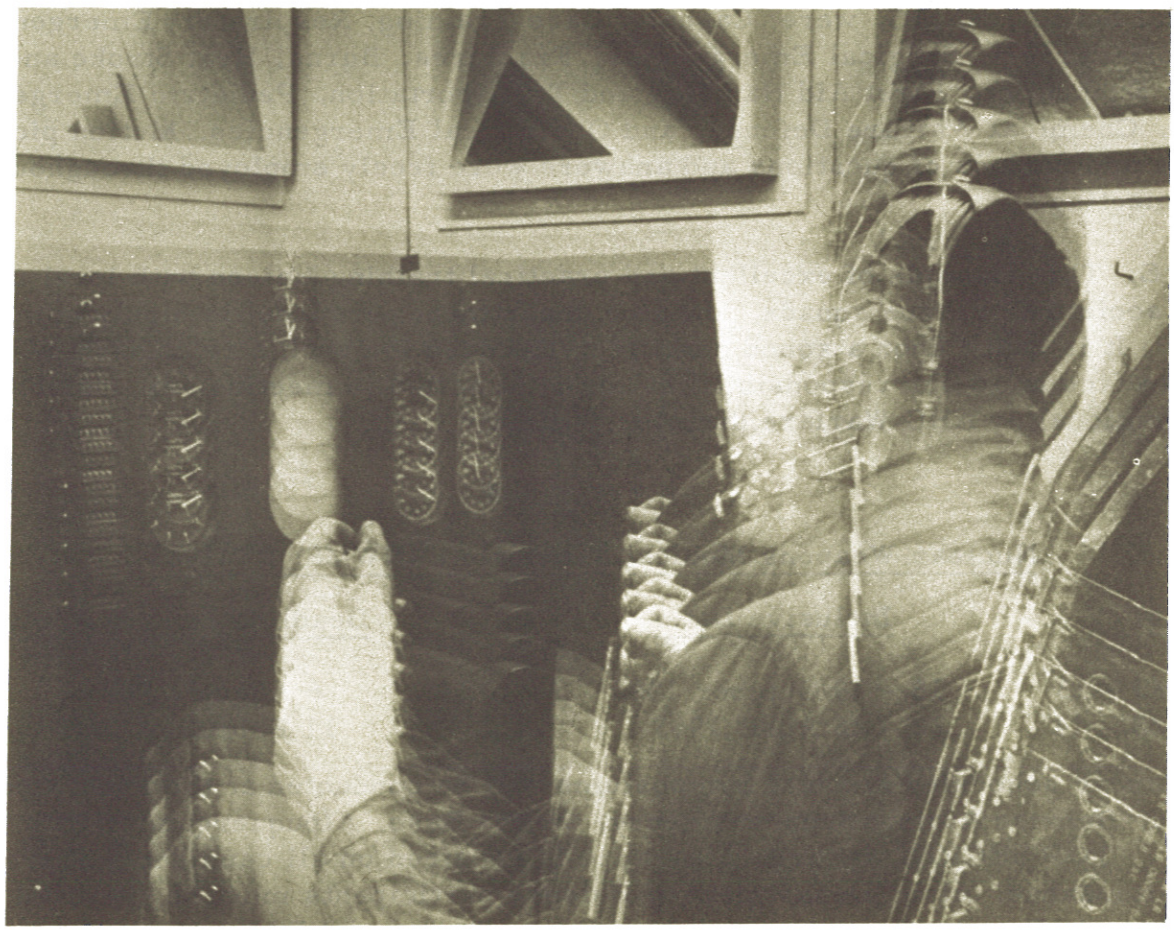
Human Vibration Studies

From News Bureau, The Boeing Company, Military Aircraft Systems Division, Wichita Kansas Branch.

Human vibration studies are continuing at The Boeing Company's Wichita, Kan., Branch, Military Aircraft Systems Division, under contract with the Office of Naval Research to determine crew reaction and performance when exposed to aircraft vibrations resulting from turbulent air.



The program has been in progress at Boeing-Wichita for more than two years. As the study continues, random vibrations on volunteer subjects will be simulated at altitudes of 500 feet and at speeds of more than 450 miles an hour with special equipment designed and built by Boeing for the research effort. Vibrations produced by the hydraulic equipment are demonstrated in this multiple exposure photograph. All tests are well within limits of human endurance according to Boeing's medical staff.

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Note of Appreciation to Doctor Holland

CAPT Philip T. Holland MC USNR-R of Bloomington, Ind., has provided BuMed's Library of the Surgeon General with bound copies of the first ten volumes of the United States Navy Medical News Letter. The crucial period covered is from 5 March 1943 through 5 December 1947. The Bureau now has bound copies of all volumes published to date. These constitute a valuable reference source to Medical Department history and military medical practices throughout these past years of explosive growth of medicine and allied sciences in general.

CAPT Holland had active service in the Pacific on the USS MISSISSIPPI from 1 November 1942 to 12 June 1944, and has participated actively in the U.S. Naval Reserve Programs since his release from active duty in February 1946. He is an outstanding Medical Officer to whom we express full appreciation for his lively and continuing interest in the welfare of the Navy's Medical Department.

—Editor

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Radiation Effects on Nervous System

For the first time in the 60 years in which physicians and scientists have been working with ionizing radiation, evidence has been detected by two Bay Area scientists that it has a direct stimulus effect on the mammalian nervous system. A psychologist and a physiologist at the U.S. Naval Radiological Defense Laboratory in San Francisco have discovered that sleeping rats will awaken within 12 seconds after exposure to a very low dosage of ionizing radiation (3 r—less than received through one's feet from a fluoroscope at a shoe store). These reactions depended upon the rate of exposure and not upon the total dose. Heart rate measurements were also made to provide additional evidence of central nervous system activation during the arousal response.

Science writers were invited to the Laboratory on 16 May 1962 to talk with these two scientists, Mr. Edward L. Hunt and Dr. Donald J. Kimeldorf, Head of the Physiology-Psychology Branch, and to observe some of their experimental work.

The use of sleeping animals was an innovation introduced by these investigators to study radiation effects on the nervous system. Prior to radiation exposure, the animals were given a 40-hour training period in an observation chamber to teach them to sleep. Since the waking response is present in blinded as well as normal animals, it cannot be attributed to the direct effect of radiation on the visual receptor system. Also, the possibility that the arousing stimulus might be noise from the sound-shielded shutter was ruled out by sham-exposure tests.

"Inasmuch as radiation is capable of arousing the sleeping animal," said Dr. Kimeldorf and Mr. Hunt, "his behavior and emotional reactions in a radiation field might well be altered. This is one of the earliest responses to radiation exposure known and its relationship to the development of radiation sickness requires investigation." (Public Information Ofc., 12th N.D., San Francisco, Cal.

NAMRU-4 Staff Members Attend Influenza Meeting

CAPT Lloyd F. Miller MC USN, Officer in Charge, NAMRU-4, CDR Robert Peckinpaugh MC USN of the USNH, LT Rytel MC USNR and Mr. W.E. Pierce of NAMRU-4 attended a meeting of the Commission of Influenza, Armed Forces Epidemiological Board. Data accumulated by the Medical Research Unit were presented. These played an important role in the Commission's decision concerning the recommended antigenic content of the influenza vaccine to be utilized by the Army, Air Force, and the Navy in the coming years.

CAPT Miller, the only military member of the Commission, presented evidence that will be extremely useful in developing optimal immunization schedule for use in recruit training. Since January 1961, the unit has been studying these effects in cooperation with Administrative Command Medical Department and the U.S. Naval Hospital, Great Lakes, Ill. This program has involved the accumulation of clinical, epidemiological, and laboratory data from more than 50,000 recruits.

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New Home for National Library of Medicine

Public Health Rep 77: 156, PHS DHEW, February 1962.

The new quarters of the National Library of Medicine, on the grounds of the National Institutes of Health in Bethesda, Md., houses the world's greatest collection of medical literature. The $7,000,000 structure, designed by the firm of O'Connor and Kilham of New York City, has space for about one and one-quarter million bound volumes on its five floors of which three are below ground. The library's collections at 7th St., and Independence Ave., S. W., Washington, D. C., and its historical and rare book collections which were in Cleveland, Ohio, were transferred to Bethesda in April 1962. The National Library of Medicine celetrated its 125th anniversary in 1961.

Among the speakers at the dedication ceremonies, held in December 1961, were Senator Lister Hill of Alabama, and Abraham Ribicoff, Secretary of the Department of Health, Education, and Welfare. Senator Hill was coauthor with the then Senator John F. Kennedy of the National Library of Medicine Act of 1956 which authorized construction of the new building.

A gift to the library presented by Alexis L. Liatis, Ambassador of the Government of Greece, was a cutting from an Oriental plane tree on the Island of Cos under which Hippocrates is reported to have taught his pupils. The tree will be planted on the Library's eleven-acre grounds this spring.

NOTE: The Medical News Letter has been advised by Dr. John B. Blake, Chief of the History of Medicine Division, National Library of Medicine, that the historical collection consists of 35,000 volumes published before 1800. During their shipment from Cleveland to Bethesda, these rare books were insured by Lloyds of London for $6,000,000. —Editor

WANTED: ARTICLES FOR TRAINING BULLETIN

The *Naval Training Bulletin* describes methods and techniques of training throughout the Navy, explains plans and programs of the Navy Department, describes training of other U. S. Government agencies and foreign agencies of interest to naval personnel, and discusses training developments that have application to naval personnel. To reflect the training in the fleet and at field activities, the *Bulletin* needs articles from readers. Those who have participated in the operation of a successful training program are in an excellent position to pass along their ideas and share their experiences. Articles from fleet personnel help make the *Bulletin* what it is intended to be: a magazine which shows what is actually taking place in the fleet, rather than one which merely emphasizes pedagogical methodology.

The following types of articles are particularly desired:

- Those describing a training program that has solved some unusual problem.
- Those which describe a new approach or reflect new ideas with respect to some persistent or recurring problem.
- Those whose success is reflected in the fact that the ship or activity has received some form of commendation.
- Those simply describing a program which has worked well or has shown practical results.

What is needed is practical material, not polished prose. The staff of the *Bulletin* will provide any editorial treatment necessary to make articles conform to accepted style and grammar.

The following is a checklist for articles submitted:

- Does the article deal with something with which the author has had first-hand experience?
- Does the article deal primarily with facts and ideas which impart information, rather than those which merely publicize?
- Has the article been read and criticized by others? Have appropriate changes been made?
- Do the main ideas stand out?
- Have photographs been made to accompany the article? Are the photographs clear?
- Is the title short and accurate?
- Can the main idea of the article be expressed in one sentence?

This checklist is intended as a guide, not a criterion against which articles are judged; for example, photographs are desired for articles, but they are not essential. Articles may be of any length, but articles containing between 750 and 2,500 words are preferred.

(Naval Training Bulletin, NavPers 14900, Bureau of Naval Personnel - Winter 1961-62)

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Naval Medical Research Reports

U.S. Naval Medical Field Research Laboratory, Camp Lejeune, N. C.

1. Evaluation of Foot Powders for Use with the Field Boot (Vol. XII, No. 9) MR 005. 12-6001. 6, March 1962.
2. Debridement Water for Field Medical Use (Vol. XII, No. 15) MR 005. 12-6001. 6, March 1962.
3. User Test of Catheterization Set, Sterile, Disposable (Vol. XII, No. 10) MR 005. 12-6001. 6, March 1962
4. Acute Respiratory Disease Associated with Coxsackie A-21 Virus Infection I. Incidence in Military Personnel: Observations in a Recruit Population. II. Incidence in Military Personnel: Observations in a Nonrecruit Population MR 005. 09-1204. 4. 5, March 1962.
5. Use of High-Speed Photography and Photoelastic Coatings for Determination of Dynamic Strains MR 005. 12-7010. 1. 12, March 1962.
6. Classification Within the Subgenus Anopheles (Diptera, Culicidae) (Vol. XII, No. 16) MR 005. 09-0010. 1. 10, April 1962

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From the Note Book

Important Notice. Professional examinations and memberships in civilian professional societies for Medical Department Officers; reporting of

The attention of all Medical Department Officers who have participated in Professional Examinations or who have submitted applications to Civilian Professional Societies is invited to BuMed Instruction 1500.4 Series. This instruction states that two certified or photostatic copies of the notification of the results of such examination or membership appointments be forwarded to this Bureau for incorporation in official records. (Training Branch, Professional Div., BuMed)

Addendum to FY 1963 U.S. Army Postgraduate Short Courses. The following addition is made to the listing of Postgraduate Short Courses for Medical Corps, Dental Corps, Medical Service Corps, and Nurse Corps Officers sponsored by the Department of the Army during Fiscal Year 1963.

Course	Installation	Date
Pathology of the Oral Regions	Armed Forces Institute of Pathology	25-29 March 1963 MC DC

The complete list was published in the U.S. Navy Medical News Letter, Vol. 39, pages 16 - 18, 4 May 1962. Pertinent BUMED INSTRUCTIONS as to eligibility for each Corps were referenced on page 16 as an introduction to that list.

Honors for Two MSC Officers.

The Military Section of the American Pharmaceutical Association has elected CAPT Claude V. Timberlake MSC USN to the position of Chairman-elect. The election took place at the annual convention of the Association, 26 - 30 March, 1962. CAPT Timberlake has served during the past year as Vice Chairman of the Military Section. He is currently assigned in the Bureau of Medicine and Surgery as a member of the Armed Services Medical Materiel Coordination Committee; as Advisor to the Director, Professional Division on matters pertaining to pharmacy, and as Assistant to the Director of the Medical Service Corps for pharmacy officers.

CAPT Roland A. Bosee MSC USN, Director of the Air Crew Equipment Laboratory, Naval Air Material Center, Johnsville, Penna., has been presented a plaque by the West Deptford Township, N.J. Kiwanis Club. The presentation was made on 27 March 1962. The plaque was engraved as follows:

"To Roland A. Bosee, Captain, Medical Service Corps, U.S. Navy, Eminent Physiologist and Bio-Chemist. For his performance as Director, Air Crew Equipment Laboratory, Naval Air Material Center, and his contribution to naval aviation, flight safety, aviation physiology, aeronautical engineering—with emphasis in the area of bio-astronautics, especially with Project Mercury."

TIO, BuMed News

AFEB Committee on Immunizations Meets. The Committee on Immunizations Armed Forces Epidemiological Board, met for three days at Harvard University in Boston. CAPT Lloyd F. Miller, Officer in Charge, NAMRU-4 reported on studies conducted by the unit pertaining to the effect of intense immunization on the incidence and severity of acute respiratory disease in Naval recruits.

Navy Doctors Speak at Madrid, Spain. CAPT Philip B. Phillips MC USN and LT John A. Sours MC USNR, Division of Psychiatry and Neurology, Naval School of Aviation Medicine, were principal speakers at a panel on Psychosomatic Problems in Space Travel at the Fifth European Congress on Psychosomatic Research in Madrid on 23 April 1962. DR's Phillips and Sours reported their study of psychosomatic disorders in aviation personnel (PIO, NavAvMedCen, NAS, Pensacola, Fla.)

School of Osteopathy Becomes School of Medicine. The American Medical Association has approved the California School of Osteopathy as a school of medicine whose graduates will receive the degree of Doctor of Medicine starting with the 1962 graduating class. The members of the class will become eligible for commissions in the Medical Corps of the Armed Services. The school, to be known as the California College of Medicine, is the first school of osteopathy to be accepted by the medical profession.

Mariner's Museum Seeks Historical Navy Objects. The Mariner's Museum in Newport News Va., is always available as a final resting place for those naval curios and oddities which are buried in your attic or closets. Under the direction of RADM George J. Dufek USN (Ret), the museum is a collection of objects which are connected with the history of the U. S. Navy. The museum staff is always willing to accept any contributions from donors who feel they have an object that has played a part in the Navy's history. Appropriate contributions should be forwarded by mail to the Mariner's Museum, Newport News Va.

(NAVNEWS)

BUMED INSTRUCTION 6780.1C 4 May 1962

Subj: First aid kits for aircraft and flight personnel

Ref: (a) MANMED arts. 3-34 and 3-35

Purpose. To insure availability, prescribe allowances, permit operational flexibility, and disseminate information relative to first aid kits for aircraft and flight personnel.

Cancellation. This instruction supersedes and cancels BUMED INSTRUCTION 6780.1B (NOTAL)

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DENTAL SECTION

Oral Hygiene for Hospital Patients

Alice A. Tronquet, School of Dentistry, University of Washington, Seattle, Wash. JADA 63:215-217, Aug. 1961. Dental Abstracts 7(3):138-139, March 1962.

A suction toothbrush designed to facilitate improved oral hygiene for the patient who is extremely ill has been developed at the University of Washington School of Dentistry and demonstrated successfully at the University of Washington Hospital. The toothbrush, based on an idea suggested by Capp (1958), is an inexpensive, simple instrument for individual, hospital-patient mouth care. A small piece of flexible plastic tubing is inserted through a hole drilled in the head of the brush. The tubing extends from just below the level of the bristle tips down the handle of the brush to the suction apparatus. The tubing is held to the toothbrush handle by small rubber bands.

The toothbrushing procedure is as follows:

1. The toothbrush should be shown to the patient, and the patient told he is going to have his teeth brushed. He is turned on his side and a pillow placed at his back for support. A face towel is placed under the chin and over the bedding.

2. The tooth brush is attached to the suction outlet and the brush laid on the towel near the patient's mouth.

3. If a rubber bite-block is used, it is placed between the teeth on one side of the patient's mouth. The string tied to the bite-block is fastened to the patient's gown with a pin to eliminate any possibility that the bite-block will be swallowed.

4. The brush is dipped into a glass of warm water to soften the bristles. A flavored mouthwash may be added to the water.

5. The cheeks and lips on the side of the mouth opposite the bite-block are retracted with the forefinger and the middle finger. Only the labial and buccal surfaces of the teeth are brushed. A Charters' toothbrushing method or a gentle, modified rolling stroke, with mild vibrations, is used. The suction should be applied over each tooth surface and particular attention given to each interproximal area. The brush should be remoistened frequently to remove the mucin from the bristles. The bite-block is moved to the opposite side of the mouth and the brushing procedure is repeated on the other side of the mouth.

6. The bite-block is removed from the mouth after all teeth have been

brushed. The toothbrush is placed in a cup of clear water to clean the tubing and remove the mucin from the bristles. Then the suction is disconnected.

Petroleum jelly may be used to moisten the lips and gingiva of a patient whose tissue has become dry through illness.

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Storage of Dental Alloy and Mercury Together Prior to Trituration

Malcolm D. Jendresen and Gunnar Ryge, Marquette University, Milwaukee, Wis. IADR Abstracts of the 40th General Meeting, March 1962, Page 96, Article M42.

The practice of pre-weighing and storing of alloy and mercury together in gelatin capsules or similar receptacles is not uncommon. The effects of extended periods of storage time on various physical properties of dental amalgam were studied. Representative alloys (filings and pellets) were selected. Recommended ratios were utilized. Weighed alloy filings or pellets and mercury were placed in gelatin capsules together for periods of 1, 2, 7, and 14 days. At the end of the storage period mechanical trituration was carried out and specimens were fabricated for compressive strength and dimensional change determinations. Throughout the storage period observations were made in regard to spontaneous amalgamation and crystal growth. When alloy pellets were used compressive strength tests showed a decrease in strength as a function of storage time, whereas little, if any change occurred when alloy filings containing zinc were stored with mercury. Dimensional change determinations revealed expansion of the order of 70 μ/cm of non-zinc alloys after 24 hours storage with mercury. Some alloys were observed to react with mercury, and in some instances, amalgamated extensively during the storage period. It is concluded that alloy and mercury should not be stored in contact prior to trituration.

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Accumulation of Strontium-90 in Primary Teeth of American Children

Harold L. Rosenthal, John E. Gilster and John T. Bird. Washington University, School of Dentistry, St. Louis, Mo. IADR Abstracts of the 40th General Meeting, March 1962, Page 12, Article 41.

Primary incisors, cuspids, and molars of St. Louis children are being collected and analyzed for strontium-90 concentration in order to test the feasibility of using teeth as a measure of the radioactive nuclide body burden. The collecting program was initiated in 1959 for a 10 year study. Teeth are catalogued by birth date of the child, carious vs. non-carious, breast-fed vs.

bottle-fed and with or without roots. Crowns, including enamel and dentin, are pooled by half year intervals into samples of adequate size for analysis of Sr-90. The samples are ashed, and the Sr-90 separated from calcium by a method developed by the U. S. A. E. C. The data are expressed in terms of micromicrocurie (uuC) per gram tooth calcium.

In second molar carious crowns of bottle-fed children born in 1947, very low levels of Sr-90 (0. 15 uuC) were found. This value increases to 0. 25 uuC in 1948 and remains constant at this level until 1951. The values begin to increase to 0. 6 uuC in 1952, 1. 09 uuC in 1953 and 1. 65 uuC in 1954. The roots of second molars follow the same general pattern as crowns but contain about 3 times more Sr-90. Crowns of sound incisors of bottle-fed children show a gradual increase in Sr-90 content from 0. 23 uuC for children born in 1950 to 1. 95 uuC for those born in 1955. The data so far obtained indicate that the accumulation of Sr -90 in the teeth of children born as late as 1954 has not as yet reached peak values.

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Personnel and Professional Notes

Panel Discussion on Mouth Preparation for Complete Dentures. A panel discussion on Mouth Preparation for Complete Dentures was recently presented to staff, resident and postgraduate Dental officers, and civilian and military guests at the U. S. Naval Dental School, NNMC, Bethesda, Md.

Commander Frank J. Kratochvil, DC, USN, Head of the Removable Partial Denture Branch of the Prosthodontics Department of the Naval Dental School was the moderator for this panel. The panelists were Dr. Daniel F. Lynch of the Mead Dental Hospital, Washington, D. C., and consultant to the Naval Dental School and Dr. Gustav O. Kruger, Chief of Dental Staff, Georgetown University Hospital, and consultant to the Naval Dental School, who presented the Oral Surgeon's views. Colonel Edmund S. Olsen, USA, Commanding Officer of the Central Dental Laboratory, Walter Reed Army Medical Center and Dr. Dewey H. Bell, Head of the Prosthodontics Department of the Medical College of Virginia, Richmond, Virginia, presented the Prosthodontist's viewpoint.

Each panelist was given 8 to 10 minutes to present his basic views on planning mouth preparation for dentures, emphasizing the exchange of information between the prosthodontist and the surgeon. Three case histories were presented with the use of study casts, roentgenograms and Kodachrome slides. Each panelist was given an opportunity to discuss each case history. Following the panel presentation there was a question and answer period.

Dental Health Added to Military Subjects List at Camp Lejeune. The curriculum of the 2nd Force Service Regiment's General Military Subjects School has been expanded to include a course in dental health. A survey of dental health among the personnel stationed at Camp Lejeune prompted the inauguration of

the new course. Force Service Regiment compulsory attendance to the one-week school made it ideal for the trial method of mass indoctrination in oral hygiene. All personnel E-6 and below attend the school averaging approximately sixty men per class.

The course is composed of lectures on proper care of the teeth and supporting structures; demonstrations on the correct way to brush teeth; and color slides showing the different dental diseases. Brochures containing detailed dental health information are passed out to encourage individual study. The emphasis of the course is placed on proven measures for prevention and control of dental disease, both in the field and garrison.

An outgrowth of the new course has been the establishing of a Dental Health Bar in the training area. The Bar is equipped with water, paper cups, dental floss, Stimudents and tooth brushes. Correct usage of the various items is described in a series of enlarged photographs tacked to a backboard at the Bar.

In commenting on the new course, Lt Col J. R. Haynes, Regimental Executive Officer, said, "This preventive dentistry program inaugurated with 2nd FSR has certainly proven its worth and will eradicate dental problems of combat Marines."

Capt C. T. Pridgeon, DC, USN, is the Base Dental Officer at Camp Lejeune.

DT3 G. C. Fillmore Presented Letter of Commendation. The Commanding Officer of the U. S. Naval Dental Clinic, Naval Weapons Plant, Washington 25, D. C., presented a letter of Commendation to DT3 G. C. Fillmore, USN, for his outstanding performance in the Finance Office of that Command.

His commendation read in part - "You have demonstrated outstanding qualities in initiative, dependability and technical skill in accomplishing the varied and complex duties involving inventories, requisitions and record maintenance of dental supplies and equipment.

You have shown an exceptionally high degree of industry, loyalty, and proficiency in the performance of your duties. Your performance serves to promote the efficiency of the operations of the Finance Office. As a result the over-all functions of this Command can provide more and better dental care for members of the Armed Forces. ---"

Capt J. L. Wanger, DC, USN, is Commanding Officer of the U. S. Naval Dental Clinic, Naval Weapons Plant.

Dr. Thompson Lectures at Naval Dental School. Dr. Elbert O. Thompson of Salt Lake City, Utah, conducted a series of lectures on "New Concepts of Reducing Stress and Increasing the Productivity of the Individual Dentist and his Auxiliary Personnel" on 12 April 1962 for staff, resident, and postgraduate Dental officers, and civilian and military guests, at the U. S. Naval Dental School, NNMC, Bethesda, Md.

Dr. Thompson is a Research Associate in the Human Factors Research Division, School of Dentistry, University of Southern California. He developed

and pioneered both the "washed Field Dentistry" Concept and the "Canister-Tray" Concept.

At a luncheon following the lectures, Walter J. Pelton, Chief of the Manpower and Education Branch, Division of Dental Public Health and Resources, U. S. Public Health Service, spoke on the manpower situation in the field of dentistry.

Capt Link Presents Lecture. Capt Joseph F. Link, DC, USN, Diplomate, American Board of Oral Surgery, and Chief of Dental Service, U. S. Naval Hospital, Camp Lejeune, North Carolina, presented a lecture entitled "This is Your Face" at a joint meeting of the U. S. Naval Hospital and the Camp Lejeune Dental Society. Capt Link discussed problems associated with fractures of the zygoma and their treatment, and a method for correction of mandibular prognathism.

The meeting was held at the Commissioned Officers Mess, Paradise Point, Marine Corps Base, Camp Lejeune, North Carolina on 19 April 1962. In attendance were 73 Medical and Dental officers from local activities, and 11 civilian practitioners from the neighboring area.

BUMED Notice 5390 of 4 April 1962 - Naval Leadership; Implementation of General Order 21. The purpose of the Notice is to assure that BUMED-managed activities have formalized Naval Leadership Programs for all personnel assigned to the commands as directed by General Order 21.

During the survey of BUMED-managed activities by the Inspector General, Medical, and the Inspector General, Dental, it has been noted that all activities have a local instruction covering all facets of the Leadership Program but that implementation in some instances could be improved.

The objective of General Order 21 is to reemphasize and revitalize Naval Leadership in all its aspects: inspirational, technical, and moral.

Papers Presented at International Association of Dental Research Meeting. The following papers were presented before the 40th General Meeting of the IADR held 15-18 March 1962 at the Sheraton Jefferson Hotel, St. Louis, Mo., as part of the Navy Dental Corps' intramural research program.

Radiation Research in the Modification of Dental Polymers - Capt N. W. Rupp, DC, USN

Trace Elements in Human Parotid Saliva - T. S. Meyer

Some Characteristics of Parotid Fluid Intrinsic Protein - Cdr Kirk C. Hoerman, DC, USN

Infrared Studies of Human Saliva - B. L. Lamberts

Dental Examination Reliability - Capt A. G. Nielsen, DC, USN

Improved Method for Intra-oral Polishing Procedures - Capt Francis P. Scola, DC, USN

Characteristics of Protein in Teeth and Bones, Including the Fluorescence of Some Electrophoretically Homogenous Fragments - Cdr K. C. Hoerman, DC, USN

Strength, Dimensional Change, and Adaptation of Amalgam Prepared with 1:1 Ratio - Capt R. B. Wolcott, DC, USN

Antibiotic Influence on Caries in the NMRI-D-Rat - Capt C. A. Ostrom, DC, USN

The State of Dental Health of Young Male Adults in Relation to Certain Socio-Economic Factors - Capt G. H. Rovelstad, DC, USN

Factors Influencing the Periodontal Health of Naval Recruits - Lt W. R. Shiller, DC, USN

Vital Cell Activity in the Oral Cavity - Capt G. H. Rovelstad, DC, USN

Intradermal Injection of 2, 6 Dichlorobenzenoneindophenol for the Tissue Level Determination of Ascorbic Acid - Lt J. S. Lindsay, DC, USN

Cooperative Study of the Soil-caries Relationship in New Zealand - Capt F. L. Losee, DC, USN

Internal Splinting of Implanted Teeth With Polyester Resin Formulae - Capt R. A. Middleton, DC, USN

A Fluorescence Microscopic Study of Alveolar Bone Repair Phenomena - Cdr P. J. Boyne, DC, USN

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OCCUPATIONAL MEDICINE

Toxic and Health Effects of Plastics and Resins

John A. Zapp, Jr., Haskell Laboratory for Toxicology and Industrial Medicine, E. I. Du Pont Nemours & Co., Wilmington, Del. AMA Arch Environ Health 4:335-346, March 1962.

Twenty-five years ago a discussion of the toxic and health effects of plastics and resins would have been relatively easy on two counts. There were relatively few synthetic plastics and resins in common use, and such uses as were common were relatively trivial in comparison with competitive materials.

World War II gave great impetus to the use of synthetic plastics and resins. On the one hand they were able to replace natural materials, particularly metals and natural rubber, which were often in short supply. On the other hand synthetic materials, e.g., nylon, turned out to be superior to available natural materials for certain uses.

It is difficult to define plastics and resins in a very meaningful way. Chemically, they are very large molecules, called polymers, formed by the

linking up of small molecules, called monomers, into large cohesive chain-like units. If only one monomer is involved in forming the polymer, it is called a homopolymer. If two different monomers are involved, the polymer is called a co-polymer; if three, a terpolymer.

Polymers can be classified in several other ways. If the monomers simply link up into long chains by joining bonds, and nothing is eliminated in the process, the polymer is called an addition polymer.

If the linking up of monomers is accomplished by the elimination of part of the monomeric molecules, the resulting polymer is called a condensation polymer.

If the long chain polymer molecules are not joined laterally to one another, the plastic or resin is usually flexible because the molecular chains slide against each other when a deforming force is applied. This flexibility can be increased by mixing in with the polymer molecules an internal lubricant, known as a plasticizer.

It is characteristic of polymers that they soften when exposed to heat and when soft can be made to flow and assume desired shapes. When cooled, they again become hard. Some polymers, if reheated, become soft again; these are the thermoplastic resins. Other polymers, when heated for the first time, undergo further chemical reactions in which cross links develop between polymer chains, holding them rigid in the position assumed as a result of the first heating. These are the thermosetting resins, and they do not soften on reheating like the original polymer.

When we say that polymers are chains of large molecular weight, no particular degree of largeness is specified. If only a few molecules are linked together, the resultant molecule is called an oligomer. So, a polymer is larger than an oligomer in that it contains many rather than a few monomer units.

It is also apparent that a polymer may be composed of polymer chains of varying length. When a monomer polymerizes, a chain builds up in length until something terminates the process. Termination may occur sooner in some chains than in others. If the process is random, the final polymer will be a statistical distribution of molecular chains of varying size, and the molecular weight of the resultant mixture can only be expressed in terms of average and standard deviation; of normality or skewness of distribution, etc. In general, the average molecular weight of the polymer will be of the order of thousands or millions.

It has frequently been stated of the plastics and resins that the molecules are so big and so chemically inert that they are also physiologically inert. If ingested, they are too big to be absorbed from the gastrointestinal tract and hence pass through unchanged. If placed in contact with the skin, they are too big to penetrate or react readily with the skin. If inhaled as dust, they behave as typically "inert" dusts in the lung. These statements are in all probability true for most of the molecules comprising the polymer. The exceptions relate in general to the oligomers, and even monomers in some cases, which make up a small fraction of the total polymer molecules.

For example, polyethylene manufactured by the high pressure process came into use as a container for foods about 1946. The average molecular

weight of the polymer usually ranged from 5000 to about 40,000. Its structure is essentially that of a long chain aliphatic hydrocarbon. It is insoluble in almost all solvents at room temperature, although it swells in contact with hydrocarbon solvents like hexane or heptane, benzene, lubricating oils, and the like. The swelling is due to the penetration of the polymer chains by the solvents. It is no wonder that the U. S. Food and Drug Administration in 1951 listed polyethylene as a suitable resin for use as a food packaging film on the basis of its structure and physical properties.

By the summer of 1958, however, the Food and Drug Administration learned that commercial polyethylene contained a low molecular weight fraction that might become a component of a fatty food contacting the polyethylene. When the Food Additives Amendment of 1958 became effective, the Food and Drug Administration confirmed the prior sanction status of polyethylene as a food packaging resin only with respect to its use on non-fatty foods. It permitted its continued use in contact with fatty foods only on an extension-of-time basis pending further study and evaluation of the data.

The sequel to this is that all thirteen producers of polyethylene in the United States assembled data on the chemical identity of the low molecular weight fraction in their various polyethylenes, and on the amount extractable by fatty foods. This information enabled the Food and Drug Administration to establish specifications for polyethylenes suitable for contact with fatty as well as non-fatty foods, and a regulation setting forth the specifications was issued in June, 1961.

This example merely illustrates the fact that polymer molecules are not all of the same large size, and that some are small enough to be diffusible from the plastic or resin. As with polyethylene, the low molecular weight fraction is not necessarily harmful, but its safety must be evaluated.

Some plastics and resins may actually contain unreacted monomer. Phenol formaldehyde resins as well as other formaldehyde resins sometimes contain free formaldehyde in sufficient concentration to be detectable by odor. The free formaldehyde can be kept to safe limits, however, by adequate curing of the resin.

It might be well to note at this point that exposure to monomers and low molecular weight polymers is much more apt to occur during the manufacture of these materials than during their subsequent use. Thus the manufacturer is more liable to toxicity and health problems from monomers than is the user of the finished plastic or resin. In some cases, however, the plastic or resin is deliberately supplied in an incompletely polymerized state in order that the user might complete the process at the site of application. Examples of this would be the acrylic denture materials and the polyurethane insulating materials or lacquers.

In the former application, molding powder composed of polymethylmethacrylate is mixed with liquid monomer, an activator and color. The monomer acts both as a plasticizer for the polymer and a bonding agent as it itself is polymerized. Since methyl methacrylate monomer is a skin sensitizer, a number of dentists and dental technicians have experienced dermatitis

problems. The resulting polymerized denture material, however, has rarely caused any trouble for the patients.

Polyurethane resins are likewise often supplied in "prepolymer" form for final polymerization at the site of application. A typical example is that of the polyurethane foamed insulation materials.

A characteristic polyurethane prepolymer is formed by the reaction, in the absence of water, of diisocyanate (usually toluene diisocyanate, or TDI) and a glycol. The glycol now terminates with isocyanate groups (-NCO) and has acquired urethane groups (-RNH · COOR'-) in the process. The prepolymer contains a slight excess of TDI.

If water and a catalyst are added to the prepolymer, a further reaction takes place. This reaction is exothermic. As polymerization takes place the evolved CO_2 "foams." The mixture grows more viscous and rigid under the combined influence of heat and increasing molecular weight and traps the CO_2, thus giving the final cured foam plastic. In the process, small amounts of TDI monomer may be volatilized.

Toluene diisocyanate is not a highly toxic material but it is extremely irritating to the respiratory tract and may cause asthma-like attacks which begin several hours after exposure and clear up without after-effects in a few more hours. Repeated exposure to TDI vapors may produce an allergic sensitization of the respiratory tract in susceptible individuals.

Since polyurethane resins are being formed in place on a rather large scale, there has been an unusual amount of interest in the definition of the safe upper limit of concentration of the monomer in the air, variously called the Threshold Limit Value, Hygienic Limit, or Maximum Allowable Concentration (MAC). The American Conference of Governmental Industrial Hygienists in 1956 established a tentative Threshold Limit Value of 0.1 ppm for toluene diisocyanate (TDI) and this has prevailed until this year when the ACGIH lowered the Threshold Limit Value to 0.02 ppm. It may be of current interest to comment briefly on the respective numbers and the reasons for the change.

Bearing in mind that TDI and other similar monomeric diisocyanates are more irritating than toxic, and that they are capable of producing allergic sensitization, the safe level in the atmosphere should be that which does not produce primary irritation or induce sensitization of exposed workers. Our estimate of such a level, based on animal exposures, was 0.1 ppm. Some cases of respiratory sensitization have occurred, however, in some plants in which the TDI concentration was supposedly maintained at or below 0.1 ppm. It was assumed, therefore, that susceptible workers exposed to 0.1 ppm of TDI could become sensitized, and the safe upper limit was, accordingly, revised downward to 0.02 ppm.

The author relates that he does not know whether the assumption is valid and the revision justified. So far as he has been able to learn, there is no proof that sensitized workers did not occasionally receive gross overexposures prior to becoming sensitized. Only time will tell whether 0.02 ppm will prove to be a more correct estimate of the safe level than 0.1 ppm.

The important point, however, is that one should avoid, to the greatest extent possible, exposure to chemicals which are capable of causing allergic sensitization. It is a tricky business, for example, to find out just how much poison ivy you can pull up with your bare hands before you become sensitized, and persons exposed to the monomeric diisocyanates should take all indicated precautions to keep their exposure at a minimum.

The finished cured polyurethane resins are not sensitizers because any exposed isocyanate groups would react with water vapor in the air and be destroyed.

Plasticizers are not the only materials added to plastics and resins to modify their properties. Chemicals are sometimes added to stabilize the polymer against decomposition by light or heat. Others may be added to retard atmospheric oxidation. Dyes or pigments may be added to impart color. Perhaps this complexity of plastics and resins can be illustrated by reference to the Federal Register of August 8, 1961, establishing a regulation on permissible ingredients for continuous resinous and polymeric coatings to be used on metal substrates (i.e., can liners) in contact with foods. It amply indicates the fact that plastics and resins may be more complex than just polymers in evaluating health and toxicity problems relating to such plastics and resins. It is fair to state that such toxicity and health problems which have arisen in the past from the use of plastics and resins have been overwhelmingly due to the non-polymeric components rather than to the basic polymers.

There is another area, however, in which health problems have arisen in connection with plastics and resins, and this concerns not the plastics and resins as such, but rather their decomposition products under the influence of heat.

One of the earliest indications of hazard from this source came from the Cleveland Clinic disaster of 1929, in which stored nitrocellulose base X-ray film caught fire. Dense brown fumes spread through the hospital and 125 persons were killed. Death appeared, in most cases, to have been caused by inhalation of carbon monoxide and nitrogen oxides, both of which were thermal decomposition products of nitrocellulose.

Nitrocellulose is an outstandingly hazardous material so far as combustion is concerned, but it is characteristic of organic polymers that they will begin to decompose at some critical temperature and thereafter decompose at an increasing rate as the temperature is raised above the critical level. Some, such as nitrocellulose, will burn freely if ignited. Others like "Teflon" TFE-fluorocarbon resin will not burn spontaneously but will nevertheless decompose if sufficient heat is applied externally. As plastics and resins find more extensive use as replacements for older materials, it is natural that there be increasing concern lest exposure to excessive heat or fire result in the production of unusually toxic atmospheres.

Conflagrations can be divided broadly into two classes, those which are well ventilated, and those which are poorly ventilated. A well ventilated conflagration is one in which there is free access of air to the fire. In this event the gaseous products of combustion are dissipated rapidly by the strong thermal

currents and injury, if it occurs, is almost always due to thermal effects alone.

A poorly ventilated conflagration is one in which the access of air is restricted. In this case, there are several consequences. First, combustion does not go to completion. If the combustible material contains carbon, as it usually does, carbon monoxide will be formed as well as carbon dioxide. Second, there will be a depletion of oxygen in the air in the vicinity of the fire. Third, there will be heat. And finally, there will be special pyrolysis products characteristic of the substances being burned. If injury occurs, it will be due to heat, oxygen lack and carbon monoxide as well as to the special pyrolysis products. It is the belief of the author, based on World War II research with flame throwers, that the three factors heat, oxygen lack, and carbon monoxide are usually of more overriding importance as toxic factors than the more esoteric special products of combustion.

Of course, there may be situations, as in the Cleveland Clinic disaster, where the products of a poorly ventilated combustion may be transported some distance by natural or forced ventilation, and in which heat ceases to be a significant lethal factor. This does not invalidate the generalization that gaseous products of combustion are of little importance as lethal factors in a well ventilated conflagration, and that carbon monoxide, oxygen lack and heat are apt to be the most important lethal factors in a poorly ventilated conflagration, regardless of what material is being burned.

Finally, it may be of interest to discuss briefly the hazards of combustion or thermal decomposition of the "Teflon" TFE fluorocarbon resins, both because the volume of our correspondence indicates a lively current interest in them, and because of certain interesting features of the story.

The "Teflon" TFE fluorocarbon resins are analogs of polyethylene in which all of the hydrogens of polyethylene are replaced by fluorine atoms. The monomer, tetrafluoroethylene, while more toxic than ethylene is still quite low in toxicity, the LC_{50} being 40,000 ppm for 4-hour exposure of rats. It polymerizes readily to polymers of very large molecular weight, which are characterized by their extreme chemical inertness and thermostability. Male and female weanling rats placed on the author's laboratory diets containing 25% of finely ground "Teflon" TFE resins for 90 days showed no sign of toxic effects and no pathological changes detectable by gross or microscopic examination of the tissues.

"Teflon" TFE resins are among the most thermostable of all the synthetic plastics and resins, being rated for continuous use at 260° C. At this temperature the weight loss is from 0.0001 to 0.0006% per hour depending on the type resin. Since the TFE resins soften at 327° C, the melting point of lead, they are not likely to be serviceable for continuous use at or above this temperature, but they can stand brief exposures for short periods of time to temperatures as high as 540° C. The TFE resins do not liquefy on exposure to heat, but decompose by giving off gases and particulate matter commonly referred to as sublimate. If thermal decomposition is carried out in the absence of air, more than 95% of the decomposition products is the monomer, tetrafluoroethylene. If carried out in the presence of air, the monomer is still the

major decomposition product, but at temperatures from 200° C to 400° C small amounts of other fluorocarbon gases of 3 to 5 C atoms, HF, and silicon tetrafluoride have been detected. At about 400° C small amounts of a highly toxic C_4 compound, perfluoroisobutylene begin to appear, but this gas has not been detected below 380° C.

"Teflon" TFE resins can be ignited by flame since the gaseous decomposition products will burn at 690° C, but once the flame source is removed, the "Teflon" itself will not continue to support combustion. The ultimate combustion products are CO_2, CF_4, and HF. No free fluorine gas has been detected among the pyrolysis or combustion products of Teflon and its formation is not favored by thermodynamic considerations.

All of the above would lead one to conclude that heated Teflon TFE resins should not present an appreciable life hazard and this has been borne out both by laboratory experiment and a usage history covering more than a quarter of a century. To the best of our knowledge, no one has ever been killed by exposure to the thermal decomposition or combustion product of the Teflon resins.

However, the Teflon resins do present, on exposure to heat, a unique toxicity and health problem which became evident even before the product became commercial. Sufficiently hot Teflon gives off something which when inhaled produces in man a condition like metal fume fever. It has been variously called polymer fume fever or the "shakes." Like metal fume fever it resembles influenza so far as symptoms are concerned and it passes off without treatment or after-effects in a matter of hours or at most a day or two. In most cases its occurrence has followed the smoking of tobacco contaminated with dust or particles of Teflon. In the minority of cases it has followed close proximity to freshly sintered Teflon articles as they have been removed from the sintering oven.

In the ordinary course of events one would study polymer fume fever in the laboratory by producing it in experimental animals breathing air drawn over Teflon resins heated to various temperatures. One would find the lowest temperature at which the syndrome occurs and would analyze the pyrolysis products at that temperature. The causative agent would be identified by the process of elimination. One could determine the threshold concentration of the agent needed to produce the polymer fume fever and could then estimate a Threshold Limit Value or MAC for man. Unfortunately, experimental animals do not get polymer fume fever any more than they get metal fume fever, so this avenue of approach was closed.

On a priori grounds, one could assume that the likelihood of getting polymer fume fever would depend (1) on the temperature of the Teflon resin because this determines the decomposition rate; (2) on the quantity of Teflon being heated because a large quantity of Teflon at a given temperature might release as much of the causative agent as a smaller quantity of Teflon at a higher temperature, and (3) on the duration of exposure since this would determine the amount of contaminated air taken into the lungs.

Since industrial processors of Teflon resins may handle many pounds per day, it was felt that a conservative recommendation would be that one

should provide ventilation if Teflon were heated above the temperature at which pyrolysis is just detectable. This was estimated as roughly 200° C or 400° F. At or below this temperature the quantity of Teflon handled and the exposure time should be irrelevant since the Teflon simply wouldn't be giving off pyrolysis products. This, then, was the basis for Du Pont label warnings to provide ventilation or respiratory protection if the Teflon were heated above 200° C or 400° F. It was directed to people handling large quantities of Teflon in industry. For such purposes the recommendation is adequate but perhaps overconservative, because the two conditions under which polymer fume fever is known to occur involve much higher temperatures, 370-430° C in the sintering operations and perhaps up to 538° C in burning tobacco. On the other hand, the quantity of Teflon consumed in a burning cigarette was bound to be small and yet was capable of evoking the syndrome.

In the intervening years little more has been learned about polymer fume fever. It is now suspected that the causative agent has a very brief time life, and that a short travel path from source to lung, as in smoking, is an important factor. A dog has been obliged to "smoke" (repeatedly through a face mask) cigarettes containing up to 200 mg of Teflon. It neither produced the polymer fume fever nor any other observable harmful effect. It is concluded from this that there is a wide margin of safety between the quantity of Teflon producing the polymer fume fever in man and that which might cause more drastic or lethal effects. One is inclined to suspect the particulate matter evolved during the pyrolysis of Teflon more than the gases simply because metal fume fever is caused by a particulate.

It would undoubtedly be much more satisfying if the causative factor of the polymer fume fever could be identified and a MAC value assigned to it. The American Conference of Governmental Industrial Hygienists has, in fact, made two attempts to supply at least a number. In 1960 they established a tentative threshold limit value of 0.005 ppm for Teflon pyrolysis products without specifying what products. In the 1961 list the tentative value is 0.05 mg/M^3 "as F." The author knows of no scientific basis, however, for either of these numbers.

In a laboratory situation one can, of course, kill animals by exposing them to the pyrolysis products of Teflon resins.

The toxicity of the Teflon resins is not outstanding. It is interesting also that improvement in processing techniques over the past few years has made it possible to prepare tetrafluoroethylene monomer of higher purity than heretofore. This has resulted in a significant increase in the temperature at which the polymer can kill laboratory animals.

There is one other item about the health and toxicity hazards of the Teflon resins which illustrates a human frailty rather than a property of the resin. Sometime in the middle 1950's there arose a rumor that a machinist had smoked a cigarette contaminated with a little Teflon and had subsequently died. In its most extreme form the rumor stated that the machinist took one puff and that his lungs filled up with fluid and he died within five minutes. It is interesting that the vehicle by which this rumor spread was official safety bulletins issued by responsible industrial concerns and by military installations. In no

case did a bulletin state that the fatality had occurred in the company or installation issuing the bulletin. An aircraft plant on the West Coast, for example, attributed the incident to a certain eastern Air Force installation. Another Air Force installation attributed it to the aircraft plant on the West Coast. In no case were authorities able to pin down the alleged event to an actual occurrence. In 1958 the Inspector General, U. S. Air Force issued the following statement:

"Although the rumor appeared in several local Air Force publications, a complete investigation by the Air Force Medical Service has proved it to be completely unsubstantiated. There is no known case of Teflon toxicity which has occurred in Air Force or Air Force-Contractor facilities."

Within the past 12 months the same old rumor has enjoyed a remarkable resurrection. It appeared, for example, in at least 3 safety bulletins issued in the Pittsburgh area as well as in other sections of the country and again including some Air Force installations. The features were identical with the earlier cycle. The alleged death never occurred in the facility issuing the bulletin, whose authors copied the story from someone else's bulletin or based it on verbal information from someone who had seen or heard of such a bulletin. One company quite recently copied the story from a bulletin long since disavowed by its originators and sent 137 copies of its version to locations in the United States, Canada, and Mexico. And while this company states that each of these locations has since received a retraction, one can predict that the original will live longer than the retraction. On July 13, 1961, and again on October 20, 1961, the U. S. Air Force reiterated, in a message to all Air Force installations, the fact that the rumor had never been substantiated in spite of thorough investigation.

But in spite of all this, the rumor marches on. Another example appears in the October 21, 1961 issue of the Canadian Medical Association Journal as a letter to the editor over the signature of an industrial physician from British Columbia. This letter contains verbatim chunks from a safety bulletin issued in New York in October 1960 and rescinded in December, 1960. The author of the letter states that his information is derived from a publication of the British Columbia Fire Chiefs' Association, and he apparently was unaware of the ultimate source of his words. The Journal editorialized on the letter, commenting, "When a hazard is reported... sufficient evidence must be given to allow the reader to judge, on the spot, whether the conclusion is justified. These criteria have been fulfilled... in... (the) letter that appears elsewhere in this issue."

The human frailty illustrated by this recital is, of course, our readiness to accept and repeat rumors without checking the facts, simply because the rumor sounds credible. It is not confined to matters of health and toxicity but is perhaps accentuated in that field, to which many popular fads and fancies bear witness. It has been encouraging, however, to find that many industrial hygienists, toxicologists and physicians have been quick to question the accuracy of the rumor and have been of great assistance in securing its retraction.

As a class, the plastics and resins are not as exempt from health and toxicity problems as one might have supposed them to be on the grounds of their large molecular weight and chemical inertness. There are problems of monomers, of low molecular weight fractions, of adjuvants, and of thermal decomposition and combustion products; and we must be alert for them. The recognition of problems, however, is the first requisite for their solution; and the synthetic plastics and resins of today are much safer than their predecessors.

It is likely that plastics and resins will continue to find expanding uses in our technology. With sufficient effort it should be possible to make sure that they will be as safe as or safer than the older materials which they will be replacing.

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Spray Painting of Aircraft

Reported by Oscar Sobol, Industrial Hygienist, Naval Air Station, Alameda, California.

Spray painting of aircraft, as ordinarily performed, is accompanied with copious clouds of overspray which envelops the painters. Where painting is done over deck exhaust grilles, the over-spray cloud is less dense but is still present and respiratory protection continues to be necessary. The amount of atmospheric contaminants in the breathing zone of the painters is extremely variable and depends on such factors as air pressure, type of spray nozzle, paint formulation, ventilation and the individual techniques of operators.

A rough average exposure of one group of spray painters was as follows: Toluene, 200 $\pm$ 400 parts per million; Methyl Ethyl Ketone, 300 $\pm$ parts per million. The higher values of exposure were found when operations were conducted in relatively confined areas such as wheel wells. The lower values were found in the open ventilated areas when all of the painters were on the same side of the aircraft. In the case of higher concentrations, air-fed respirators should be used. For lesser exposures, a chemical cartridge respirator is sufficient.

The Nordson Airless Spray Painting Process appeared in a production scale trial to be very effective in limiting overspray to a minimum. In this system hydraulic pressure is used to propel the paint through a special gun and nozzle, and there are provisions to heat the paint thereby using less solvent and getting a finer spray. There was virtually no overspray with this system. The average exposure during painting in the confined areas amounted to 30 - 50 ppm for both toluene and methyl ethyl ketone. The source of exposure seems to be evaporation from fresh paint over the deck grilles (0 - 25 ppm) rather than the aerosol when air spray is used. There also appears to be a substantial saving in materials with the airless system. Because of these promising results, several airless units were purchased for production painting and it may be possible to adopt this method for use with epoxy paints. At present the units are being used in the small parts paint shops and in the maintenance shops.

Devran, Epoxy Resin Tank Coating

Reported by M. S. Gabis, Industrial Hygienist, Charleston Naval Shipyard, Charleston, S. C.

Undesirable effects were reported by employees engaged in spray application of Devran. Six employees were given a complete physical examination including blood study and urinalysis. The results in each case failed to reveal the presence of any abnormal condition which would indicate exposure to some toxic material. The complaints were a feeling of lassitude and nausea occurring shortly after the men had removed their respirators upon completion of one job and while waiting for assignment to another. In no case were employees affected during the actual spraying, regardless of how long an operation lasted. It was apparent that the precautionary measures now employed were adequate for protection against toxic hazards during the actual spray application of Devran. However, it was noted that the cotton coveralls became saturated with the solvent used in this system, thus exposing personnel to its vapors when protective respirator devices were removed. The solvent is a mixture which includes butyl cellosolve, a compound having a rancid odor and capable of producing narcosis. It was recommended that impervious outer coveralls be worn to protect clothing.

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RESERVE SECTION

Reserve Status of Physicians, Dentists, and Medical and Dental Students

A number of Reservists who have become physicians or dentists, have not changed their Naval Reserve status.

Through personal preference, or through inadvertence, they have continued as line or staff corps officers or as enlisted men rather than apply for commissions in the staff corps which is directly concerned with their civilian-acquired skills.

This "problem" was brought to light during last fall's partial mobilization. Some officers had retained their 1315 designators, and were members of recalled air squadrons, although they were practicing physicians and dentists in civilian life.

As physicians and dentists, these officers were not eligible for mobilization with their squadrons. Instead, these officers were required to resign their Reserve commissions and, if they desired, could apply for appointment in the appropriate staff corps.

Evidence of graduation from an approved school of medicine or dentistry, is justification for the voluntary or involuntary termination of any Naval Reserve status inconsistent or incompatible with these civilian-acquired skills.

Reservists who are enrolled in an approved school of medicine or dentistry, may apply for appointment as ensign, probationary, 1915 (medical) or 1925 (dental) as appropriate.

They may, if they wish, retain their current Reserve status until graduated; however, they will not be authorized to take part in inactive duty training or in active duty for training.

Additional information will be found in BuPers Notice 1120 of 26 March 1962 and Article H-1406 Bureau of Naval Personnel Manual.

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Annual Convention of the American Medical Association

The American Medical Association will hold its annual meeting at the McCormick Place, Chicago, Illinois on 25-27 June 1962. Military symposia will be conducted on 25, 26, and 27 June.

Eligible (active status) inactive duty Naval Reserve Medical Department officers may earn 3 retirement point credits for attendance at symposium sessions provided they register with the military representative present. The program of the Section on Military Medicine is as follows:

Monday, June 25th - 2 P.M.

Business Meeting: Election of Officers

Chairman's Address: Our Expanding Medical Horizons - Outer Space
Paul R. Leberman, M. D., Philadelphia, Pa.

Mental Health Program in the Armed Forces
John M. Caldwell, M.D., The Institute, Jackson Memorial Hospital, Miami, Fla.

Submarine Psychiatry
E. H. Ninow, M.D., U. S. Naval Medical Research Laboratory, Groton, Conn.

Psychogenic Deafness: Evaluation and Management
William C. Livingood, M.D., U. S. Naval Hospital, Philadelphia, Pa.
Discussant: Francis L. Lederer, M.D., University of Illinois College of Medicine, Chicago, Ill.

The Continuing Threat of Smallpox
Abram S. Benenson, M.D., Walter Reed Army Institute of Research, Washington, D. C.

Adrenal Cortical Response in Motion Sickness
Elmer V. Dahl, M.D.; John J. Franks, M.D.; John R. Prigmore; and R. L. Cramer, PhD.; Lackland Air Force Base, Tex.

Tuesday, June 26th - 2 P.M.

Activities of the Office of the Deputy Assistant Secretary of Defense (Health and Medical) During the Past Year

Frank B. Berry, M.D., Office of Assistant Secretary of Defense (Manpower), Washington, D. C.

Some Aspects of Radiation Control Aboard the USS Enterprise (CVA(N)65)

Lewis H. Seaton, M.D., USS Enterprise, Newport News, Va.

Possible Ocular Protection from Atomic Flash Burn

Howard A. Minners, M.D. and Norris L. Newton, M.D., USAF School of Aerospace Medicine, San Antonio, Tex.

Medical Research and Development Panel

Moderator: James H. Forsee, M.D., U. S. Army Medical Research and Development Command, Washington, D. C.

Bioastronautic Research in the Air Force

William C. Marett, M.D., Office of the Surgeon General, Headquarters United States Air Force, Washington, D. C.

Enzyme Deactivation by Radiofrequency Energy

Sven A. Bach, M.D.: Charles R. Goucher, PhD.; and Gerhard J. Korteling, U. S. Army Medical Research Laboratory, Fort Knox, Ky.

Epidemiology of Non-Bacterial Pneumonia in Naval Recruits

L. F. Miller, M.D.; J.C. Maisel, M.D.; M. W. Rytel, M.D.; P. DeBerry; W. T. Stille; W. E. Pierce, M.D.; Y. Crawford; E. Edwards; M. Rosenbaum; P. Frank; and R. Lytle, U. S. Naval Hospital, Great Lakes, Ill.

U. S. Navy Tissue Bank - Current Methods and Experimental Approaches to the Future

R. B. Gresham, M.D., U. S. Naval Medical School, Bethesda, Md.

Wednesday, June 27th - 9 A.M.

Joint Meeting with the Section on Diseases of the Chest

Protective Effects of Hypothermia in the Exploration of Space

Abraham T. K. Cockett, M.D. and Cecil C. Beehler, M.D., School of Aerospace Medicine, Brooks Air Force Base, Tex.; Willard E. Goodwin, M.D., University of California Medical Center, Los Angeles, Calif.

Special Aspects of Pulmonary Function Under Hyperbaric Conditions

William B. Wood, M.D. and Lloyd H. Leve, M.D., U. S. Naval Weapons Plant, Washington, D. C.

Symposium on Lung Cancer

Lung Cancer and Its Study in the Veterans Administration

Lyndon E. Lee, Jr., M.D., Veterans Administration, Washington, D.C.

Study of Lung Cancer Diagnosis by X-Ray and Cytology

Abraham M. Lilienfeld, M.D., The Johns Hopkins University School of Hygiene and Public Health, Baltimore, Md.

Reliability and Significance of Histologic Typing of Lung Cancer by Biopsy

Raymond Yesner, M.D., Veterans Admin. Hospital, West Haven, Conn.

Solitary Pulmonary Nodules

John D. Steele, Jr., M.D., Veterans Admin. Hospital, San Fernando, Calif.

Wednesday, June 27th - 9 A. M.

Joint Meeting with the Section on Diseases of the Chest

Symposium on Lung Cancer (continued)

Adjuvant Chemotherapy in the Surgical Treatment of Bronchogenic Carcinoma
George A. Higgins, Jr., M.D., Veterans Administration Hospital, Washington, D. C.

Prognosis and Management of the Inoperable Lung Cancer Patient
Julius Wolf, M.D., Veterans Admin. Hospital, Bronx, N. Y.

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Annual Convention of the American Optometric Association

The American Optometric Association will hold its annual meeting at the Sheraton Hotel, Chicago, Illinois on 18-21 July 1962. Military symposia will be conducted on 18, 19, 20, and 21 July.

Eligible (active status) inactive duty Naval Reserve Medical Department officers may earn 4 retirement point credits for attendance at symposium sessions provided they register with the military representative present.

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